**NUMBER TRICKS**

**DUE DATE: *\_\_\_\_\_\_\_\_\_\_\_\_\_***

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| **NAME** |  | **CLASS** |  | **DATE** |  |

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| **You will be assessed on the following criteria:** | | |
| **Criterion B**: *Investigating Patterns (max 8)* | ***Your level:*** |  |
| **Criterion C**: *Communications in Mathematics (max 6)* | ***Your level:*** |  |

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| **YOUR TASK: Design and analyze a number trick in which you utilize different operations.** |

**INTRODUCTION:**

At the beginning of the unit, your teacher showed you some number tricks. Many (or perhaps all) of you got the same result after performing the number trick. You will design your own number trick using the operations that we have studied in this unit.

**TASK DETAILS:**

* You will design a number trick that will include at least five steps and four different operations/index laws.
* You will select ten different values, input them into a spreadsheet and then perform your number trick on these ten values. Based on your results, propose a conjecture on the outcome of your number trick. Your spreadsheet calculations should be strong evidence for your conjecture.
* Show the algebraic expression for each step of your number trick, and then write the simplified expression that represents the result of the trick. Use this to confirm the validity of your conjecture.
* You will be given class time to work on and complete this assignment. You should complete all your rough work in the spaces provided and hand in with your final work. You may take your rough work home, but your final work and your spreadsheet should be complete during the allotted class time.

***ROUGH WORK – Show below:***

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**MY NUMBER TRICK:**

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| **STEPS** | **ALGEBRAIC EXPRESSION** |
| 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| 7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Listen to your teacher for instructions on how to hand in your spreadsheet.**

**See the rubric on the next page to complete your self-assessment below:**

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| **SELF-ASSESSMENT** | **B**  **C** | **STUDENT COMMENT:** |

**Checklist when completing the assessment task – Have you:**

* Written out and proofread your steps for your number trick?
* Created your spreadsheet demonstrating your number trick for ten different values?
* Handed in your spreadsheet as instructed by your teacher?
* Shown algebraic expressions for each step of your number trick, and a conjecture for the result of your number trick?
* Handed in your rough work?
* Completed the self-assessment above?

**To obtain the highest level for each of the following criteria you will need to do the following**

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| **Criteria** | **Level** | **Descriptors** | **Indicators** |
| **Criterion B**  **INVESTIGATION PATTERNS** | **0** | * Has not reached a standard described below. | * You have not reached a standard described below. |
| **1 – 2** | * Uses basic inquiry techniques to solve problems * Shows a small part of the working out with guidance from the teacher | * You have **attempted** to create the number trick. * Your work shows a **part** of the working out. * You needed **guidance** from the teacher to help understand the pattern. |
| **3 – 4** | * Uses basic enquiry techniques to solve problems * Recognizes some simple patterns. * Shows part of working out and shows some understanding of what has been found. | * You have **created** a number trick. * Your work shows **some** understanding of the patterns and underlying operations used in the number trick. * Your spreadsheet shows a **small range** of values being used to confirm patterns in the number trick. |
| **5 – 6** | * Uses inquiry techniques to solve problems * Recognizes simple patterns in different situations * Arrives at a single result and makes predictions based on extending the pattern(s) * Describes simple patterns as relationships | * You have **created** a number trick. * Your work shows a **good** understanding of the patterns and underlying operations in the number trick. * Your spreadsheet shows a **good** range of values used to confirm patterns in the number trick. * You described the patterns in a way that is **consistent with findings**. |
| **7 – 8** | * Uses inquiry techniques to solve problems * Recognizes simple patterns in different situations * Arrives at a single result and makes predictions consistent with findings * Describes simple mathematical relationships and general rules | * You have **created** a number trick. * Your work shows a **very good** understanding of the patterns and underlying operations used in the number trick. * Your spreadsheet shows a **broad** range of values used to confirm patterns in the number trick. * You described **and justified** patterns in a way that is consistent with findings. |

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| **Criteria** | **Level** | **Descriptors** | **Indicators** |
| **Criterion C**  **COMMUNICATION IN MATHEMATICS** | **0** | * Has not reached a standard described below. | * You have not reached a standard described below. |
| **1 – 2** | * The work is untidy and incorrectly set out. * Few mathematical symbols and terminology has been used correctly with guidance from the teacher. | * Your work (including spreadsheet) is **difficult** to follow. * **Few** mathematical symbols and terminology are used correctly. * **Guidance** from the teacher was needed. |
| **3 – 4** | * Some of the work is neat and correctly set out. * Some appropriate mathematical language and notation have been used correctly. * Different forms of representation have been used. | * Your work is **well** presented and your descriptions are clear. * You have used **good** mathematical language. * You have **attempted** to show your number trick in words, using a spreadsheet and algebraically. |
| **5 – 6** | * Most of the work is neat and correctly set out. * Mostly appropriate mathematical language and notation have been used correctly. * Different forms of representation have been used. * You have stated the steps followed to solve the problem. | * Your work is **well** presented and your descriptions are **very** clear. * You have used **excellent** mathematical notation and terminology throughout the assignment. * You have used **multiple representations** to illustrate and s**upport** your findings. |